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ACCELERATION TECHNIQUES BY POST-PROCESSING OF NUMERICAL SOLUTIONS OF THE HAMMERSTEIN EQUATION

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ABSTRACT. In this paper, several acceleration techniques for numerical solutions of the Hammerstein equation by post-processing are discussed. The paper is motivated by the results reported in papers [**7, 8**]. Results in these papers are concerned with certain post acceleration techniques for numerical solutions of the second kind Fredholm integral equation. Techniques consist of interpolation post-processing and extrapolation. Post-processed solutions are shown to exhibit better accuracy. We propose in this paper to generalize the results in [**7, 8**] to nonlinear integral equations of the Hammerstein type. An extrapolation technique for the Galerkin solution of Hammerstein equation is also obtained. This result appears new even in the setting of the linear Fredholm equation.

1. Introduction. In this paper, we investigate a number of post-processing techniques which can be used to enhance the accuracy of numerical solutions of nonlinear integral equations of the Hammerstein type. Post-processing techniques discussed here can be classified into two groups, one based upon an interpolation and another based upon an extrapolation. Motivation of this paper originates in a recent paper [**8**] in which similar results were obtained for linear integral equations of the Fredholm type. One of the goals of this paper is to extend the results in [**8**] to a class of nonlinear equations. Accuracy enhancing post-processing techniques by iterative methods are well documented in terms of linear [**1**] as well as nonlinear integral equations [**4, 5**]. The iterative method, when applied to the collocation method as well as to the Galerkin method, double the order of the accuracy of a

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